Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

ant, with now and then a bar sinister, of the wild breed, and the domesticated races of the country are likewise their descendants, but with an ancestry hopelessly confused and intermixed by outside crosses and influences.

EXPLORATION OF THE GULF OF MAINE WITH THE DREDGE.

BY A. S. PACKARD, JR.*

THOUGH it was the original intention to devote the month to an exploration of George's Bank, it was decided on account of the "Bache's" defective boilers to work nearer shore and extend farther from land the work of the U. S. Fish Commission, for the season located in Casco Bay ; the dredging operations being conducted under the charge of Professor Verrill. This involved an examination of certain unexplored portions of that great indentation lying between Cape Sable, Nova Scotia, and Cape Cod, and which is laid down on the charts as the "Gulf of Maine."

Through the researches of Messrs. Stimpson, Verrill, myself and others in the Bay of Fundy, and of Drs. Gould, Wheatland, Stimpson and others in Massachusetts Bay, together with the very thorough examination of Casco Bay and vicinity pursued during the past summer by Professors Baird and Verrill, we had attained a very complete knowledge of the coast fauna of New England north of Cape Cod. Moreover, the explorations of George's Bank made by Messrs. Smith, Harger and myself last year in the "Bache," had given us some idea of the nature of the sea bottom there, dredging having been carried on at a depth of four hundred and thirty-two fathoms by Messrs. Smith and Harger, and in one hundred and fifty fathoms by myself.

---

*Report of Explorations with the Dredge on the U. S. Coast Survey Steamer "Bache," in the Gulf of Maine, during September, 1873, under the direction of Prof. Baird, U. S. Fish Commissioner, made to the Superintendent of the Coast Survey and to the U. S. Commissioner of Fisheries. In all the work I had the invaluable aid of Mr. C. Cooke, with his great experience in dredging, and owe much to the ready aid and sympathy of Commander Howell, Executive Officer W. H. Jaques, and Lieuts. Hagerman, Jacob, Rush, Bradbury, and Dr. Dickson. Samples of bottom water were taken up at nearly every station, the metal water bottle being used. For the identification of the specimens I am indebted to Professor Verrill.

It now remained to explore some interesting localities within George's Bank, and at a distance from the coast. This report embraces an account of a reconnoissance of Jeffrey's Bank, lying south of Mt. Desert Island; Cashe's Ledge, another bank lying southwest of Jeffrey's Bank; of Jeffrey's Ledge, a northeastern submarine prolongation of Cape Ann; and Stellwagen's Bank, a northerly extension of Cape Cod. As intermediate points were investigated, the series of dredgings may be regarded as conducted along six main lines, running out easterly from the shore between Portland and Cape Cod.

On the 2d of September, the "Bache," with Lieut. Jaques temporarily in command, left Peak's Island, Casco Bay, the headquarters of Professor Baird and his associates, and made a harbor for the night at Boothbay. Early the next morning we ran out and dredged about "Monhegan Falls," in sixty fathoms, searching with dredge, tangle and trawl for the arctic coral (*Primnoa lepadifera*), a species of sea fan which grows about three feet in height. It is occasionally met with in the fiords of Norway at a depth of three hundred fathoms, while fishermen have been said to find it on the ground known as "Monhegan Falls," and a specimen two feet high, from George's Bank, is now in the museum of the Peabody Academy of Science. Our efforts to find it were, however, unavailing.*

We then ran out to Jeffrey's Bank and trawled in eighty-two fathoms, bringing up a fine Comatula (*Antedon Sarsii*), a near ally of the crinoids; this was the first specimen taken by the Fish Commission during the summer. The disk of another specimen was captured on Cashe's Ledge near Jeffrey's Bank. With this also occurred *Nymphon giganteum*, *Calliostoma occidentale*, and *Ophiocnida hispida*. We also dredged in deep brown mud, at a depth of one hundred and seven fathoms, with a temperature of thirty-nine and one-half degrees, several *Hyalonema longissimum* of Sars, hitherto only found on the coast of Norway in from one hundred and twenty to three hundred fathoms. This had previously been found off Casco Bay by Prof. Verrill. Other interesting sponges occurred, and a rare sand-star, *Ophioscolex glacialis*, new to America,* and which was dredged by Thompson at a depth of six hundred and forty fathoms near the Færöe Islands. Everywhere on Jeffrey's Bank and Cashe's Ledge the mud was reddish-brown. At noon of September 4th the sea became too rough to dredge, and we ran into a harbor at George's Island, north of Monhegan, for shelter, and on the succeeding day returned to Portland for repairs. On September 12th the "Bache" left Portland for a farther exploration of Jeffrey's Bank, Capt. Howell in command, and on the 13th a series of dredgings were made on each side of the southern extremity of it, at depths of sixty,† one hundred and five, and one hundred fathoms (the last point being Station 17. Here the arctic sponge, *Hyalonema longissimum*, occurred), with excellent success. The weather appearing threatening we ran into Portsmouth.

---

* In stations 1, 2, 3, 4 and 5 of my notes, and all from within ten to fifteen miles south of Monhegan Island (station 5 being fifteen miles southeast of Monhegan Island), in from fifty-eight to seventy-two fathoms soft mud, with a bottom temperature of 42° and 43° occurred either at one or another station, though mostly in station 5, seventy-two fathoms, the following:—*Nymphon giganteum*. Crustacea, *Hippolyte spina*, *Ptilocheirus pinguis*, *Byblis Gaimardii*, *Stegocephalus ampulla*, *Anthura brachiata*. Among worms, *Aphrodite aculeata*, *Eunoa Œrstedii*, *Nephthys ingens*, *N. ciliata*, *Ninoe nigripes* Verr., *Nothria conchylega*, *N. opalina* Verr., *Goniada maculata*, *Trophonia aspera*, *Sternaspis fossor*, *Ammotrypane fimbriata*, *Chætozone setosa*, *Nicomache lumbricalis*, *Maldane Sarsii*, *Praxilla gracilis*, *Terebrellides Stroemi*, *Melinna cristata*, *Amage auricula*, *Amphicteis Gunneri*, *Myxicola Steenstrupi*, *Chætoderma nitidulum*, *Priapulus* n. sp., *Phascolosoma cæmentarium* and *Meckelia lurida* Verr. Among the more interesting shells were *Siphonodentalium vitreum*, *Scaphander punctostriata*, *Aporrhais occidentalis*, *Neæra artica*, *N. pellucida*, *Periploma papyracea*, *Astarte lens*, *Yoldia thraciæformis* and *Y. obesa*. Among Tunicates, *Molgula pannosa*. Among Echinoderms, *Psolus phantapus*, *Lophothuria Fabricii*, *Schizaster fragilis* (in seventy-two fathoms only), *Ctenodiscus crispatus*, *Ophioglypha Sarsii*, *O. robusta*, *Ophiocnida hispida*, *Edwardsia farinacea*, *Cerianthus borealis*.

On the 16th we began to dredge on a line extending from Portsmouth to Cashe's Ledge. Stopping to dredge on either side of Jeffrey's Ledge, we found in a mud hole ninety-five to ninety-eight fathoms deep, 14 miles S. E. ¼ E. of Boone Island Light, with a temperature of 37½° and 41°‡ living *Schizaster fragilis*, a beautiful deep sea urchin; *Molpadia oölitica*, a sea cucumber; *Macoma sabu-*

---

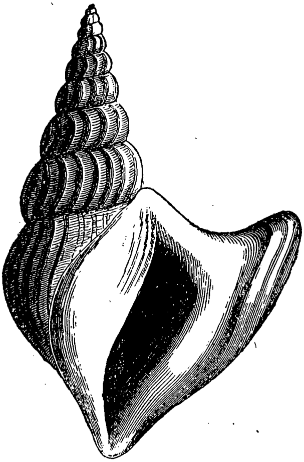
*Here also occurred among the worms, *Leanira tetragona*, *Nephthys ingens*, *N. ciliata*, *Ninoë nigripes*, numerous specimens of *Nothria opalina*, *Goniada maculata*, *Scalibregma inflatum*, *Sternaspis fossor*, *Nichomache lumbricalis*, *Maldane Sarsii*, *Praxilla gracilis*, *Terebrellides Stroemii*, *Melinna cristata*, *Amphicteis Gunneri* and *Sabella zonalis*. Also the following shells: *Siphonodentalium vitreum*, *Scaphander punctostriata*, *Periploma papyracea*, *Cryptodon obesus*, *C. Gouldii*, *Yoldia thraciæformis*, *Y. obesa*, the rare *Dacrydium vitreum*; and among Echinoderms, *Schizaster fragilis* and *Ctenodiscus crispatus*.

† Station 12, brown mud, with a bottom temperature of 42°; here occurred *Dentalium occidentale*, *Siphonodentalium vitreum*, *Scaphander punctostriata*, *Periploma papyracea*, *Macoma sabulosa*, *Cryptodon obesus*, *C. Gouldii*, *Astarte lens*, *Cyprina islandica*, *Yoldia obesa*, *Dacrydium vitreum* and *Modiolaria corrugata*.

‡ The readings of both thermometers used are given; the lowest temperature being that given by a new Casella-Miller thermometer from the Smithsonian Institution and probably nearly correct.

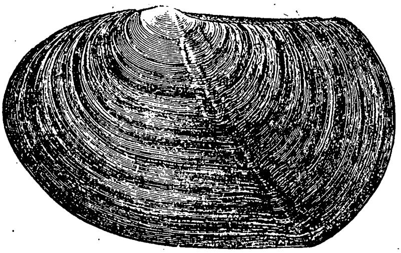
losa and *Aporrhais occidentalis* (Fig. 46), two shells rivalling in size individuals dredged by me in shallow water in Labrador. With these also occurred the remarkable *Cerianthus borealis*, *Yoldia thraciæformis* (Fig. 47; this and 46–52, from Gould's Shells of Mass.) and *Hyalonema longissimum*. This deep valley, so near the shore, afforded the lowest temperature (36½°) found during the month's work.

Fig. 46.



Aporrhais occidentalis.

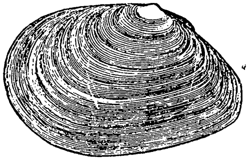
Fig. 47.



Yoldia thraciæformis.

The result of the exploration on Cashe's Ledge was extremely interesting; at depths varying from fifty to eighty fathoms over a hard, gravelly bottom characterized by multitudes of *Ascidia callosa*, or sea potatoes, the richest assemblage of life was found that we met with in the gulf. It was a rare sight to see the tangle come in over the ship's side hung with that gorgeous starfish, the bright red *Hippasteria phrygiana*, measuring fully eight inches across, with lesser forms of *Pteraster militaris*, species of Archaster (*A. arcticus* and *A. Parelii*), Cribella, Asterias, *Antedon Sarsii*, and various sand-stars, a singular barnacle, or Scalpellum (*S. Stroëmi* of Sars), attached to hydroids; an enormous sea spider (*Nymphon giganteum*); *Hyas araneus*, an arctic spider crab, and *Asellodes alta* Stm., with beautiful sponges, such as *Tethya hispida* and

Fig. 48.



Macoma sabulosa.

Thecophora ibla Thompson, dredged by him near the Shetland Islands in from three hundred and forty-four to five hundred and fifty fathoms, and remarkably beautiful spherical forms three or four inches in diameter, these latter appearing in the trawl with Tealia and *Cerianthus borealis* of Verrill, a large sea anemone. The excitement was shared in by the crew, some of whom voluntarily aided in the tedious work of separating them from the strands of the tangle.*

On our way back to Gloucester we again dredged on each side of Jeffrey's Ledge at depths of one hundred and twelve and one hundred and eighteen fathoms; at the former station east of the bank dredging the rare hag fish, *Myxine limosa* of Girard (identified by Mr. F. W. Putnam), in soft mud with a bottom temperature in both stations of 39°. On the west side of the Ledge in one hundred and eighteen fathoms occurred *Schizaster fragilis.*

On the 23d dredgings were made in Salem Harbor and off Marblehead. Two days, the 25th and 26th, were devoted to investigating the summit of Jeffrey's Ledge at a distance of nine to ten miles east of Cape Ann.†

---

*At station 21, beginning with a depth of fifty-two fathoms rocky bottom and drifting off into ninety fathoms gravelly bottom, with sand and some mud, the following species of interest occurred:—*Pycnogonum pelagicum.* Crustacea, *Hyas araneus, H. coarctatus, Lithodes maia, Pandalus annulicornis, Caridion Gordoni, Hippolyte borealis, H. pusiola, Thysanopoda* sp., *Tritropis aculeata, Paramphithoë cataphractus, P. pulchella, Œderus lynceus, Unciola irrorata, Asellodes alta* and *Balanus porcatus.* Worms, *Hermione hystrix, Harmothoe imbricata, Euphrosyne borealis, Nereis pelagica, N. fucata, Eunice virida, Nothria conchylega, Ninoë nigripes, Trophonia aspera, Tecturella flaccida, Nichomache lumbricalis, Cistenides granulatus, Terebrellides Stroemii, Thelepus cincinnatus, Amphitrite cirrata, Myxicola Steenstrupi, Sabella zonalis, Potamilla aculifera, Protula media, Filigrana inflexa, Vermilia serrula, Spirorbis lucidus, S. quadrangularis, Phascoloma borealis?, P. cæmentarium, Nemertes affinis, Admete viridula.* Mollusks, *Astyris rosacea, Buccinum undatum, Neptunea decemcostata, Natica clausa, Calliostoma occidentale, Diadora noachina, Polycera* sp., *Scaphander punctostriata, Entalis striolata, E. agilis?, Mya truncata, Macoma sabulosa* (Fig. 48), *Yoldia obesa, Modiolaria corrugata,* and other common shells. Among the Tunicates, *Ascidiopsis complanatus, Cynthia carnea, Ascidia* n. sp., *Amarœcium glabrum, A. pallidum* and *Leptoclinum albidum.* Polyzoa, *Discofascigera lucernaria, Idmonea pruinosa, Tubulipora crates, Hornerea lichenoides, Crisia eburnea, Flustra solida, Discopora Skenei, Cellepora ramulosa, C. scabra, Myriozoum subgracile* and others. Among Echinoderms, *Lophothuria Fabricii, Schizaster fragilis, Asterias vulgaris, Leptasterias tenera, L. compta, Stephanasterias albula, Solaster endeca, Cribrella sanguinolenta, Hippasteria phrygiana, Archaster arcticus, A. Parelii, Pteraster militaris, Ctenodiscus crispatus, Ophiocnida hispida,* and other common Ophiurans, *Antedon Sarsii;* and among other sponges *Thecophora ibla, Polymastia* sp., *Tethya hispida, Isodictya* sp. and *Hyalonema longissimum.*

†From stations 27, 28 and 29, from six to fourteen miles east and northeast of Thatcher's Island light, Cape Ann, on top of Jeffrey's Ledge, in from twenty-four to thirty-three fathoms rocky and pebbly bottom, the following more interesting animals

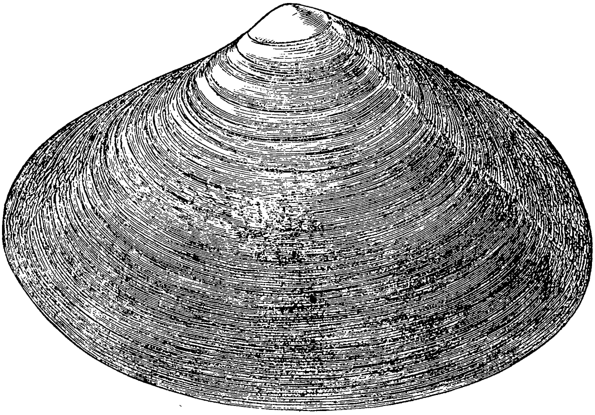
The temperature here was between 46° and 49° in about twenty-five fathoms, a difference of about ten degrees from that of the bottom on each side of this submarine elevation. Both here and afterward we used two dredges, one being thrown over from the bows, the other cast from the stern of the vessel, while the tangle was put over from her side. On the 27th we began to run a line of dredgings and soundings from Cape Ann to Cape Cod, crossing the middle of Stellwagen's Bank. Dredging in depths between fifty and sixty fathoms in soft blue mud northwest of Stellwagen's Bank, in the deepest portions of Massachusetts Bay, the fauna was found to closely resemble similar localities on each side of Jeffrey's Ledge, the assemblage not more southern in character, while the temperature of the bottom water ranged between 41½° and 45° (two thermometers being used as before). In one haul of the tangle ninety-five *Ctenodiscus crispatus*, the common pentagonal starfish of muddy bottoms, were brought up, with several very large *Asterias vulgaris*, and several young *Solaster endeca* and *papposa*. Also a gigantic Corymorpha, a hydroid polype six inches in height and fully half an inch in diameter near the base. It seemed to be a large specimen of *C. pendula*, which we afterwards dredged abundantly on the bank. We found on Stellwagen's Bank, in twenty-two to thirty fathoms coarse sand (temperature 48½° and 50½°), an abundance of *Mactra ovalis* (Fig. 49) the hen clam, *Cyprina Islandica* (Fig. 50) a shell resembling the quahaug, and *Glycimeris siliqua* (Fig. 51), a valve of *Panopœa Norvegica* (Fig. 52), with fine sponges. The Corymorpha was here

---

were taken with dredge and tangle; the more common forms are not mentioned:— *Pycnogonum pelagicum*. Crustacea, *Eupagurus Kroyeri*, *E. pubescens*, *Hippolyte borealis*, *H. polaris*, *H. aculeata*, *H. Fabricii*, *Tritropis aculeata*, *Acanthogone cuspidata* and *Balanus porcatus*. Worms, *Eunoa Œrstedii*, *Cryptonota citrina*, *Nereis pelagica*, *N. fucata*, *Trophonia aspera*, *Thelepus cincinnatus* abundant, *Amphitrite cirrata*, *Myxicola Steenstrupi*, *Sabella zonalis*, *Potamilla aculifera*, *Protula media*, *Vermilia serrula*, *Spirorbis lucidus*, *S. quadrangularis*. Mollusks, *Neptunea curta*, *Aporrhais occidentalis*, *Natica clausa*, *Turritella acicula*, *Margarita Grœnlandica*, etc., *Calliostoma occidentalis*, *Hanleia mendicaria*, *Entalis striolata*, *Panopœa Norvegica*, *Mya truncata*, *Cyclocardia Novangliæ*, *Astarte lens*, *A. undata*, *A. quadrans*, *Nucula delphinodonta*. Tunicates, *Ascidiopsis complanatus*, *Molgula retortiformis*, *Ascidia* n. sp. (the same as in stations 21 and 32, 33, 35), *Amarœcium glabrum*, *A. pallidum*, and *Leptoclinum albidum*. Brachiopoda, *Terebratulina septentrionalis*. Polyzoa, *Discofascigera lucernaria*, *Idmonea pruinosa*, *Flustra solida*, *Cellepora ramulosa* and *C. scabra*. Radiates, *Leptasterias tenera*, *L. compta*, *Stephanasterias albula*, *Pteraster militaris*, *Ophiocnida hispida*, *Halecium muricatum*, *Grammaria abietina*, *Campanularia verticillata*, *Cornulariella modesta*, and *Alcyonium carneum*. Sponges, *Thecophora ibla*, *Polymastia* sp. (the same as at stations 21 and 32–35), *Tethya hispida*, *Trichostemma* sp., *Isodictya* sp. (the same as at stations 21 and 32–35).

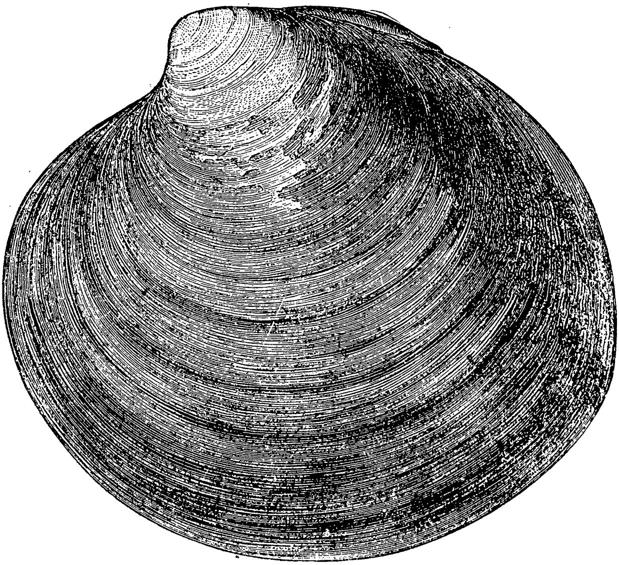
abundant, though much smaller, and the tangle brought up at a single haul from three hundred to four hundred starfish, mostly *Asterias vulgaris*. At night about ten miles north of Cape Race the tangle was kept over from half past ten until two o'clock,

Fig. 49.



Mactra ovalis.

Fig. 50.

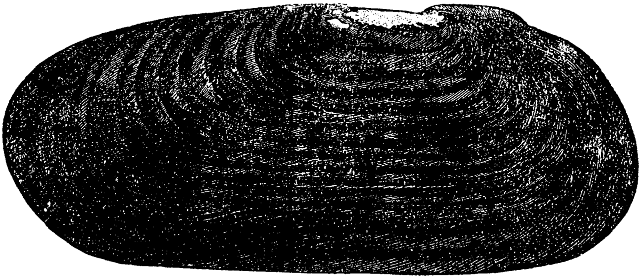


Cyprina Islandica.

when it came up loaded with *Astrophyton Agassizii*, or Medusa's Head, and other kinds of starfish, the temperature being between 48° and 50° at a depth of thirty-four fathoms.*

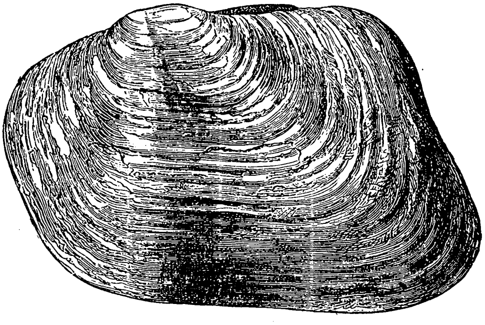
But by far the most interesting results were obtained at a distance of about fifty-five miles due east of Boston in depths of one hundred and seventeen and one hundred and forty-two fathoms, with a bottom temperature of 39° to $43\frac{1}{2}$°; the former (39°) probably the most accurate determination. Here in a remarkably te-

Fig. 51.



Glycimeris siliqua.

Fig. 52.



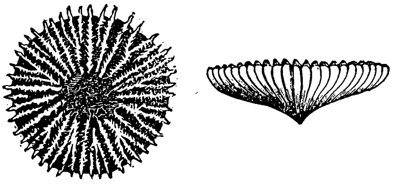
Panopæa Norvegica.

---

*At Stations 32, 33, 34 and 35 upon or near Stellwagen's Bank, though the fauna is very similar to that of Jeffrey's Ledge, the following species occurred, not met with at stations 27-29: — Crustacea, *Hyas araneus*, *Cancer irroratus*, *Eupagurus Bernhardus*, *Hippolyte borealis*, *H. pusiola*, *Paramphithoë cataphractus*, *P. pulchella*, *Moera Danæ*, *Unciola irrorata*, *Phoxus Kroyeri*, *Ptilocheirus pinguis*. Worms, *Nothria opalina*, *Rhynchobolus albus*, *Goniada maculata*, *Nichomache lumbricalis*, *Cistenides granulatus*. Mollusks, *Neptunea decemcostata*, *Aciasa borealis*, *Scalaria Groenlandica*, *Bulbus flavus*, *Turritella erosa*, *Lepeta cæca*, *Scaphander punctostriata*, *Glycimeris siliqua*, *Lyonsia hyalina*, *Pandora trilineata*, *Cyclocardia borealis*, *Pecten tenuicostatus*. The hydroid *Tubularia indivisa*, and a sponge, *Polymastia robusta*?

nacious soft blue mud, we found indications of an intermixture of the abyssal fauna characteristic of depths in the north Atlantic between one hundred and one thousand fathoms, with a temperature of about 39° Fahr. At the first station (36) examined, in one hundred and forty-two fathoms (temperature 39° to 42°) a large *Geryon* of a deep reddish flesh color occurred, having more spines on the carapace than in *G. tridens*, and with eggs. Associated with this arctic crab occurred two fragments of a true cup-coral allied to Caryophyllia. On submitting the specimens to Count Pourtales, he at once pronounced it a species of Deltocyathus, and on comparison with specimens of *D. Agassizii* Pourt. (Fig. 53, after Pourtales), from depths varying from sixty to three hundred and twenty-seven fathoms between Cuba and Florida, our specimens did not differ specifically. Pourtales remarks (p. 15) that "this coral has been pronounced by Dr. Duncan, identical with the fossil species *D. Italicus*, and though closely allied is yet readily distinguished by the costæ and other characters." With the crab and coral occurred *Amphiura Otteri* of Ljungmann, dredged by the Swedish Josephine expedition in five hundred and fifty fathoms off the coast of Portugal; it agrees perfectly, I am told by Prof. Verrill, with the description of that species. It also occurred in the one hundred and seventeen fathom station near by. Such facts as these, the occurrence of an abyssal form of sand-star on opposite sides of the Atlantic, and of the Deltocyathus, seem to favor Lovén's theory of a uniform fauna throughout the bottom of the deeper parts of the Atlantic.* At the same station occurred *Schizaster fragilis* and certain shells, among them *Dacrydium vitreum*, and several worms.† The other station (37) was ten

Fig. 53.



Deltocyathus Agassizii.

---

*I may add that on looking over some gravel dredged in October, 1872, in one hundred and fifty fathoms just northeast of the St. George's Banks, a fragment of another coral occurred, which is entirely new to the coast of North America. It is the *Ulocyathus arcticus* of Sars, as identified by Prof. Verrill.

†The following list comprises all the species found at station 36. Those with * were found at 37 also. Crustacea, **Geryon* sp., *Hyas araneus*, *Scalpellum* sp. Worms, *Nephthys ingens*, *Lumbriconereis fragilis*, *Nothria opalina* V., **Spiochœtopterus?* (tubes) **Sternaspis fossor*, *Ammochares* sp., *Maldane Sarsii*, **Arenia* sp. nov., *Terebrellides Stroemii*, *Thelepus cincinnatus*. Mollusks, *Neptunea pygmæa*, **Aporrhais occidentalis*, *Lunatia Grœnlandica*, *Doris* sp.,* *Scaphan-*

miles northwest in one hundred and seventeen fathoms with the same soft tenacious mud; the temperature 36½° to 43½°. Here occurred a smaller Geryon, perhaps a male; and apparently, judging by Wyville Thompson's figure in his work "The Depths of the Sea," p. 881, very closely related to Kroyer's _Geryon tridens;_ with this was associated the western Pelican's foot shell, _Aporrhais occidentalis_, and other shells and worms, and a variety of _Ophioglypha affinis_ of Lütken, dredged the previous year by Messrs. Smith and Harger at St. George's Bank. This day ended our explorations, and at night the Bache arrived in Salem.

The results of the month's work besides adding quite a number of forms before unknown to exist on our coast, and a few new to science, show that the fauna of the deeper portions of the Gulf of Maine is _almost_ purely arctic, the temperature at about one hundred fathoms being from 36½° to 39°. The only apparent exception to this arctic fauna is the presence of a dead broken specimen of the coral Deltocyathus, which however is not improbably a member of the deep sea Atlantic fauna, and may be found living nearer the edge of the Gulf stream in the neighborhood of the St. George's Banks. The fauna of the sandy portions, such as around the southern portion of Stellwagen's Bank, is similar to sandy beaches and adjacent bottoms on the coast of Labrador. As the arctic fauna is best known in northern Norway, so our researches this year have brought to light several forms hitherto only known from Norway, and show that the fauna of that country is identical with that of a region so far south as the area between Cape Sable and Cape Cod, and bounded on the southeast by the Gulf stream. That the waters of the Gulf of Maine do not support a fauna _purely_ arctic is shown in the absence of _Rhynconella psittacea_, while _Ophioglypha nodosa_ so abundant in shallow bays in Labrador is also wanting. Moreover _Cardium islandicum_, _C. Haysii_, and _Serripes Grœnlandica_ do not occur in anything like the abundance and size in which they may be found in shallow water (five to ten fathoms) on the coast of Labrador.

---

der punctostriata, _Dentaliumoccidentale_, *_Neæra arctica_, _N. pellucida_, _Macoma sabulosa_, _Cardium pinnulatum_, _Cryptodon obesus_, _Lucina filosa_, _Astarte lens_, *_Leda tenuisulcata_, _Yoldia thraciæformis_, _Y. obesa_, _Dacrydium vitreum_. Polyzoa, _Discofascigera lucernaria_, _Cellepora ramulosa_, _Discopora Skenii_, _Hornerea lichenoides_, _Myriozoum subgracile_. Radiates, _Gemellaria laricata_, *_Schizaster fragilis_, _Thyone_ sp., *_Amphiura Otteri_, *_Ophioglypha Sarsii_, _O. affinis_ (at station 37 only), _Endendrium ramosum_ (at 37 only), _Sertularella polyzonias_, _Deltocyathus Agassizii_, *_Edwardsia_ species.

Finally, the liberality of Professor Pierce, the Superintendent of the Coast Survey, in placing at the service of the Fish Commissioner a fine steamer and every convenience for dredging during an entire month, leads us to indulge the hope that it may in the future seem necessary to the work of the Coast Survey, to make a map of the sea bottom within soundings. The soundings in such case would be better done by the dredge than the lead, as a far better idea of the sea bottom could thus be obtained, than by the slight amount of material usually brought up by the lead, and which is sometimes misleading. A naturalist aboard could sort out the animals and send them to experts for identification. Thus, with slight extra expense, the work already began by M. Pourtales in mapping out the bottom of the Straits of Florida, could be extended, and our north Atlantic sea bottom would be studied and mapped out, and the results, while advancing science, be of great practical value in navigation and the fisheries.

THE YELLOWSTONE NATIONAL PARK.

BY THEO. B. COMSTOCK, B.S.

II. ITS IMPROVEMENT.

Having shown, I trust conclusively, the value of the park from a scientific standpoint, we may now consider in a general manner the best and most advantageous methods of maintaining and utilizing its peculiarities. Before proceeding to the discussion of this subject, it will be well to state the provisions of the act of March, 1872, which relate specially to the control and improvement of the dedicated tract of land. I quote the following passages:

"All persons who shall locate or settle upon, or occupy the same, or any part thereof, *except as hereinafter provided*, shall be considered trespassers and removed therefrom."

"Said public park shall be under the exclusive control of the Secretary of the Interior, whose duty it shall be, as soon as practicable, to make and publish such rules and regulations as he may deem necessary or proper, for the care and management of the